

**WHAT HAS BEEN HAPPENING
TO THE QUALITY OF WORKERS' LIVES
IN BRITAIN?**

Jonathan Gardner

And

Andrew J. Oswald

No 617

WARWICK ECONOMIC RESEARCH PAPERS



DEPARTMENT OF ECONOMICS

What Has Been Happening to the Quality of Workers' Lives in Britain?

Jonathan Gardner
Department of Economics
University of Warwick
CV4 7AL

and

Andrew J. Oswald
Department of Economics
University of Warwick
CV4 7AL

October 2001

For helpful suggestions, we thank participants at the 2000 National ESRC Conference and at Steve Nickell's September 2001 Leverhulme Conference at the London School of Economics, and also Jonathan Haskel, Jean Hartley, Richard Layard, Alan Manning, Nigel Nicholson, Raj Persaud, Mark Stewart, Jonathan Wadsworth and Peter Warr. The Leverhulme Trust, Nuffield Foundation, and Economic and Social Research Council provided financial support.

Abstract

This paper studies workers' lives in modern Britain. It uses longitudinal data to examine stress and job satisfaction through the decade of the 1990s. The results are disturbing. On both measures, the wellbeing of British public sector workers worsened sharply over the decade. The size of the deterioration was between one half point and one full point on a standard GHQ mental stress scale. This is remarkably large. Stress levels among private sector employees also rose. Job satisfaction in the private sector ran approximately flat through time. These findings may be of interest to nations who are thinking of adopting the British government's policies towards the public sector, and to those who have conjectured that working life is becoming more pressurised.

What Has Been Happening to the Quality of Workers' Lives in Britain?

1. Introduction

A modern literature is springing up at the border between economics and psychology. It studies the influence that economic and other forces play in determining mental wellbeing.¹ This paper builds on emerging research and asks a practical question: what has been happening to the quality of workers' lives in Britain?

The paper's answer is disturbing. We document a large rise in measured stress, and a decline in job satisfaction, over the 1990s. This is true whether or not an adjustment is made for workers' greater real income. The decline in mental wellbeing in British workplaces is most marked in the public sector. Although conjectures of this sort have been made in the popular media, our findings appear to be the first based on statistically representative samples².

In the early 1990s, the British government embarked on a process of reform. The public sector was subjected to greater, and more formal, scrutiny. League tables on the performance of health and education authorities were published. Schools underwent external inspections, and newspapers printed the results. Market forces were introduced into the state sector; contracting-out and the encouragement of competitive tendering forced public sector suppliers to compete with private firms. Workers such as college employees were required to reapply for their own jobs. In 1993, tough budgetary limits were also imposed upon the public sector, and pay awards recommended by public

¹ For example, Easterlin (2001), Frey and Stutzer (2001), Ravallion and Lokshin (2001), Hamermesh (2001) and Helliwell (2001). This literature is in fact a return to an older tradition: the important precursors include Easterlin (1974), Freeman (1978), Hamermesh (1977) and Layard (1980).

² Oswald (1997) provides some evidence, drawing upon unpublished General Household Survey research done with David G. Blanchflower, that job satisfaction in Britain ran approximately flat for a short, much earlier period. This does not distinguish between sectors or use a measure of mental stress.

sector review bodies were not properly implemented.³ This experiment is of interest to other countries, because they may choose to follow suit.

Despite anecdotal evidence of high levels of mental distress in particular cross-sections (Kapur, Borill and Stride, 1998; West et al 1998), and concern about recruiting (Machin, 1999), comparatively little attention has been paid to the wellbeing of randomly chosen samples of public sector workers. This paper examines the stress and satisfaction of these employees, and contrasts outcomes with those in the private sector. Our work can be viewed as complementary to recent research on the public-private wage differential (such as Blackaby et al, 1999).

The central finding of the paper is that, over the 1990s, there was a decline in the quality of working life in Great Britain. In the public sector, there was a particularly sharp increase in stress levels and fall in job satisfaction. This happened in absolute terms, and relative to private sector employees. Individuals choose in which sector they work (and, in some cases, whether to work at all), and the characteristics of employees can differ between the public and private sectors of the economy. To assess and correct for these things, the paper does a number of checks. The fundamental result, however, emerges even in simple cross-tabulations of the data.

Section two discusses ways to measure workers' wellbeing. Section three outlines our data, which are an annual panel from 1991 to 1999. Section four gives the results. Section five summarises.

2. Subjective measures of worker wellbeing

Self-reported wellbeing measures are known to be a reflection of at least four factors: circumstances, aspirations, comparisons with others, and a person's baseline happiness or disposition (e.g. Warr, 1999). Frey and Stutzer (2001) document evidence that recorded

³ For a discussion of the change in public sector pay, see Blackaby et al (1999), Disney and Gosling

wellbeing levels have been demonstrated to be correlated, in the expected direction, with objective characteristics, such as unemployment, and with the person's recall of positive versus negative life-events. Wellbeing is also positively correlated with assessments of the person's happiness by friends, family members, and his or her spouse. Moreover, physiological responses -- heart rate, blood pressure measures and skin-resistance measures of response to stress -- are correlated with wellbeing responses.

An argument in favour of the ability of the researcher to make use of wellbeing data is found in Kahneman et al (1997). The authors posit that functions relating people's subjective feelings to physical variables are similar for different types of individuals. They suggest that the wellbeing of an event can be viewed as having a basic scale: pleasant, neutral, and unpleasant. Other scales may expand the positive or negative categories to a finer degree but the neutral case is a constant. It is argued that the distinctiveness of this neutral value provides a focal point that allows some confidence in matching subjective experiences across time for a given individual and to support a form of interpersonal comparison.

Assume a reported wellbeing function:

$$r = h(u(y, z, t)) + e \quad (1)$$

where r is some self-reported number on an ordinal wellbeing scale, $u(\dots)$ is thought to be an individual's true level of wellbeing, $h(\cdot)$ is a non-differentiable function that relates actual to reported wellbeing, y is real income, z is a set of demographic and personal characteristics, t is the time period, and e an error term. It is assumed, as seems plausible, that $u(\dots)$ is a function observable only to the respondent. Its structure cannot be conveyed unambiguously to the interviewer or any other individual.

(1998) and Elliott and Duffus (1996).

The error term, e , therefore subsumes, among other factors, the inability of human beings to communicate accurately their wellbeing level.⁴ This measurement error in reported wellbeing would be less easily handled if wellbeing were to be used as an independent variable.

3. Data

The data used in this study come from the British Household Panel Survey (BHPS). The BHPS is a nationally representative sample of more than 5,000 British households, containing over 10,000 adult individuals, conducted late each year from 1991 to 1999. Respondents are interviewed annually. If an individual leaves the original household, all adult members of their new household are also interviewed. Children are surveyed once they reach age 16. Together this should ensure that the sample remains representative of the British population.⁵ These data include detailed information on earnings, education, employment characteristics and demographics, worker wellbeing and job satisfaction. Attention is here restricted to those individuals aged less than 65 and in employment at the survey date. This is approximately 5,000 respondents in any one year.

The BHPS contains a standard mental wellbeing measure, a General Health Questionnaire (GHQ) score. This is a variable used by medical researchers and psychiatrists as a measure of stress or psychological distress. It is still unfamiliar to some economists (one of the first uses was in Clark and Oswald, 1994), but the GHQ is probably the most widely used, questionnaire-based method of measuring mental stress. It amalgamates answers to the following twelve questions:

⁴ This recognises the social scientist's instinctive distrust of a single person's subjective 'utility' and the likelihood that self-reported data, whilst informative, will be subject to error.

⁵ Nathan (1999) undertakes a systematic analysis of the effects of attrition upon the BHPS. He compares responses to those from Census data, the General Household Survey (GHS) and the Family Expenditure Survey (FES), with respect to age, sex, marital status, socio-economic group, ethnicity, employment status and household characteristics. The author concludes that cumulative attrition in the BHPS is limited and does not lead to serious bias in inference.

Have you recently:

1. *Been able to concentrate on whatever you are doing?*
2. *Lost much sleep over worry?*
3. *Felt that you are playing a useful part in things?*
4. *Felt capable of making decisions about things?*
5. *Felt constantly under strain?*
6. *Felt you could not overcome your difficulties?*
7. *Been able to enjoy your normal day-to-day activities?*
8. *Been able to face up to your problems?*
9. *Been feeling unhappy and depressed?*
10. *Been losing confidence in yourself?*
11. *Been thinking of yourself as a worthless person?*
12. *Been feeling reasonably happy all things considered?*

Each one of the responses to these mental stress questions is scored on a four-point scale, from 0 to 3, where the response with the lowest wellbeing level scores 3 and that with the highest scores 0. The responses to these twelve questions are then summed to form an overall measure of GHQ distress.⁶ Higher scores signify greater mental strain. This approach is sometimes called a Likert scale and is scored out of 36. This measure of stress, or lack of wellbeing, thus runs from a worst possible outcome of 36 (all twelve responses indicating very poor psychological health) to a minimum of 0 (no responses indicating poor psychological health). Medical opinion is that healthy individuals score around 10-13 on the test. Numbers near 36 are rare and usually indicate depression in a formal clinical sense.

⁶ Responses are derived from a self-completion questionnaire. More than 94 percent of individuals answer all twelve GHQ questions (this high response rate may be because the GHQ questions are asked

A second measure of worker wellbeing is used in the paper -- employees' overall job satisfaction. Satisfaction has been found to influence subsequent labour-market actions. It is a significant predictor of quits (Freeman, 1978), for example, and is negatively related to absenteeism, non- and counter-productive work.

Within the BHPS, all working respondents are asked to rate their level of satisfaction with respect to seven aspects of their employment: promotion prospects, total pay, relations with supervisor, job security, ability to work on own initiative, the actual work itself, and the hours of work. Each of these categories is assigned a rank between 1 and 7, with 1 representing 'not satisfied at all', 7 indicating 'completely satisfied' and the numbers from 2 to 6 corresponding to intermediate levels of satisfaction (where 4 is 'neither satisfied nor dissatisfied').⁷ Finally, and subsequent to these seven questions, a question was asked:

“All things considered, how satisfied or dissatisfied are you with your present job overall using the same 1-7 scale?”

Responses to this question allow an analysis of overall job satisfaction. The method by which the questions were asked changed in 1998, with only a subset of the preliminary satisfaction questions retained. In this paper, therefore, analysis of job satisfaction is restricted to the years 1991 to 1997 inclusive, because it is only for this period that truly consistent satisfaction data are available. The GHQ data are consistent across every wave, and hence can be analysed for the whole period from 1991 to 1999.

These two wellbeing measures, GHQ and job satisfaction, are assumed to capture the flow of worker wellbeing and are used to examine how wellbeing has changed over time in both the public and private sectors.

at the start of the self-completion section of BHPS). Amongst employed respondents, the figure is approximately 96 percent.

⁷ In wave one, the categories 1, 4 and 7 are given the descriptions outlined, whilst 2,3,5 and 6 are left unlabeled. From wave two onwards, all values were given a label, with the descriptors 'mostly' and 'somewhat' added. The question itself was a constant. This issue is discussed later.

4. Results

Mental strain among British workers rose over the decade. Table 1 presents the simplest results. It shows how wellbeing levels, as measured by (Likert scaled) GHQ stress scores, have changed through time for public and private sector workers. Figure 1 plots the corresponding time trends. To be clear about the choice of units and definitions, a rise in a GHQ score is a fall in psychological wellbeing. This follows the standard usage in the medical literature.

In the annual statistics of Table 1, public sector workers are observed to experience a pronounced increase in measured stress, relative to private sector employees. Between 1991 and 1999, the average GHQ score of public sector employees worsened by approximately 1 full point, from 10.36 to 11.32. This is a remarkably large change, and, as will be explored in various ways later in the paper, a statistically significant one. As a simple indication of its large size, the difference in mean GHQ stress scores between unemployed and employed individuals -- in the BHPS data set over the period -- is approximately 2 points, which is only twice the estimated 1990s rise in public sector strain. Yet, consistent with common sense, we know from earlier wellbeing research that being unemployed is one of the worst things that happen to people.⁸

For private sector employees, average GHQ levels were initially, in 1991, similar to those observed in the public sector. They begin at 10.14, and it is not possible in the starting year of 1991 to reject the null of equality of public and private sector scores at conventional significance levels.⁹ By the end of the decade, mean GHQ levels within the private sector had also worsened. But the rise in strain is smaller, at about one third of a full GHQ point, and reaches 10.49 in 1999. From 1994 onwards, we can reject the null of equality in mean GHQ score, between the public and private sectors, for all

⁸ Clark and Oswald (1994) study the alternative Caseness score version of the GHQ, which counts the number of times, out of twelve, that an individual answers in one of two negative response categories..

⁹ Tests are here t-tests of the equality of means, allowing for potentially unequal variances.

reasonable p-values. For both public and private sector workers, therefore, there is a worsening of wellbeing in the 1990s.¹⁰ This effect is particularly pronounced for those individuals employed by the state.

These findings are based on raw cross-section results. They have no controls for other influences that might have altered over the period. Yet many factors shape, and are correlated with, GHQ. It could, in principle, be that the pattern of the stress scores in Table 1 reflects changes in the composition of the public and private sectors. The growth in stress could, perhaps, capture the growth of part-time, female, and white-collar employment observed for the economy over the period. For the public sector this may be a particular concern -- if privatisation, compulsory competitive tendering, and a shift towards more private-sector style management changed the culture. To investigate the issue more fully, the next section reports a set of regression equations. The estimated size of the increase in British public sector stress is then reduced, but the broad findings remain unchanged.

Estimation strategy

The paper explores an empirical version of equation 1. Wellbeing is assumed a function of personal characteristics such as education, age, gender and race, employer characteristics (e.g. establishment size), variables associated with the labour contract (income, hours of work, occupation), and the time period itself. Mental wellbeing for individual i , in time period t , is then expressed as:

$$r_{it} = \alpha_t \lambda + y_{it} \phi + x_{it} \beta + z_{it} \gamma + \varepsilon_{it} \quad i = 1, \dots, n \quad (2)$$

$$t = 1, \dots, T$$

¹⁰ Blanchflower and Oswald (2000) document evidence of falling wellbeing levels for the US, and flat wellbeing over time in Britain, in data sets that start in the early 1970s.

where r is the dependent variable that captures recorded mental stress, t the time trend, y the vector of pay and hours variables, x the vector of worker characteristics, z the vector of employer characteristics¹¹, ε the conformable error term with mean zero and constant variance, and λ , ϕ , β and γ the vectors of parameters to be estimated.¹² The wellbeing function is approximated as linear and, with the GHQ score (on a 0 to 36 scale) as the dependent variable, equations are estimated by OLS.¹³

Table 2a is the regression equivalent to Table 1. It estimates the gradient, year by year, of the trend in GHQ, with the observed characteristics of individual employees now held constant. Evidence of a 1990s divergence in wellbeing between public and private workers is again clear. Columns one and two of Table 2a are separate regressions for the public and private sector sub-samples. The columns report the coefficients on year dummies through the decade (and thereby measure the growth in GHQ stress relative to the starting year of 1991). Column one indicates that GHQ mental stress in the public sector is higher by, on average, 0.728 points (with a standard error of 0.203) in 1999 relative to the base year, 1991. In column two of Table 2a, the estimated rise over the decade in mental stress within the private sector is 0.312 points (with a standard error of 0.117). In both columns, the null hypothesis of no change is rejected at normal confidence levels. As a point estimate, public sector stress grew by 0.416 GHQ points relative to the private sector between 1991 and 1999.

Column three of Table 2a pools the data and does a slightly different test. It uses the whole sample and includes an interaction term between public sector status and each of the year dummies. These interaction terms capture the growth in GHQ levels in the public sector over and above that in the private sector.¹⁴ Again there is a statistically significant worsening of mental wellbeing among those who work in the public sector.

¹¹ Industry dummies are not included, because of the collinearity with public sector status.

¹² This approach implicitly assumes that wellbeing responses are cardinal.

The growth in GHQ public-private stress, between 1991 and 1999, is now estimated at some 0.532 points. These effects are large. Examining coefficients from the GHQ regression, the rise in public sector stress is, as another comparison, greater than the mental wellbeing penalty associated with being non-white (approximately 0.3).¹⁵ Table 2a includes a control for (real) pay. Higher wages are associated with higher wellbeing, with well-determined standard errors in the private and full samples

Table 2b repeats the previous analysis, but instead includes a linear time trend.¹⁶ In this case, GHQ is estimated to worsen by approximately 0.091 and 0.028 points, per year, in the sectors respectively. The interaction term in column three of Table 2b implies that public sector stress has grown, on average, 0.079 points per year faster than in the private sector. These effects are statistically significantly different from zero.¹⁷

Taken broadly, the paper's results reveal a fall in the psychological health of state sector workers in the decade. There is one caveat. The estimates could be an unreliable guide to the growth in mental strain, because Table 1 makes it clear that there was a marked jump in reported GHQ between 1991 and 1992, and this occurred in both sectors.¹⁸ Indeed, examining column two of Table 2a, mental stress levels in the private sector actually *fall* between 1992 and 1999, but the difference is small and statistically insignificant. In that sector, all the action comes in the second year of the sample. By comparison, both in columns one and three of Table 2b, public sector stress continues to grow from 1992 to 1999. The null of equality of GHQ levels in 1992 and 1999 cannot, however, be rejected at normal confidence levels. The difference in scores between 1992 and 1998 can be, so the year 1991 is not pivotal to the paper's conclusion. Table 3 undertakes a further check. It drops the first year and examines the coefficients upon a

¹³ Results are qualitatively unchanged if equations are estimated by the Ordered Probit technique.

¹⁴ The public sector dummy subsumes the effect of the public sector in 1991.

¹⁵ Positive effects denote greater stress.

¹⁶ Where the time trend equals 1 if the year is 1991, 2 if the year is 1992, etc.

¹⁷ The use of more disaggregated occupation codes produced substantially similar results.

time trend over the sub-period 1992 to 1999. Whilst the estimates suggest a positive and statistically significant worsening of GHQ in the public sector, the private sector time trend is small and not statistically different from zero. The increase in stress levels in the private sector, over the period, is therefore a result of an upward shift in GHQ between 1991 and 1992, with little increase thereafter. By contrast, public sector stress is observed to rise by 0.4 to 0.5 GHQ points between 1992 and 1999.¹⁹

The trend in public sector wellbeing and the business cycle

Pay is likely to be pro-cyclical in both the public and private sectors, but the greater volatility of pay in the private sector typically generates an observed counter-cyclical public sector pay premium (see Disney and Gosling, 1998). Public sector employment may thus be relatively more attractive in economic downturns. Therefore the relative fall in public sector wellbeing that we have observed could, in principle, be something to do with the long boom that characterised much of the 1990s.

This hypothesis can be checked. The BHPS covers the nine-year period of 1991 to 1999 and so predominantly spans a period of prosperity. Hence a complete test of whether public sector wellbeing is counter-cyclical is not possible. Nevertheless, in column four of Table 2b, the paper examines whether conditions in the local economy might influence public sector stress. To do so, we exploit regional variation in demand conditions as a proxy for national variation. The county unemployment rate²⁰ is entered as a measure of local labour market conditions. This is also interacted with the public sector indicator to allow for a differential impact of local unemployment upon GHQ stress for public sector employees.

¹⁸ This may, potentially, be due to the onset of recession.

¹⁹ In all the results that follow, estimation is upon the 1991 to 1999 sample. The broad tenor of results is the same if we omit the 1991 survey data.

²⁰ Source: Labour Market Trends (2000).

The underlying idea is a simple one. Where local unemployment is high, public sector employment is likely to be more attractive and wellbeing in that sector therefore greater. This suggests that there should be a negative coefficient upon the public sector unemployment effect (that is, greater local joblessness translates into workers feeling more content). Yet the reverse is observed -- see column four of Table 2b. The parameter on county unemployment is not, however, statistically different from zero. Moreover, the estimated time trend in public sector stress increases. Local labour market conditions do not, apparently, help explain the trend in public sector GHQ stress levels.

An alternative form of test is carried out in the final column of Table 3. If the observed positive trend in public sector stress reflects a counter-cyclical movement in wellbeing, one might expect the rise in stress to occur predominantly towards the end of the 1990s, where economic conditions are improving sharply. For the early part of the decade, where the economy is more depressed,²¹ public sector wellbeing would be expected to be relatively greater, and the trend in GHQ attenuated. Hence Table 3 analyses the data by time period. For the period 1991 to 1995, in column four of Table 3, public sector stress is here estimated to grow by 0.102 GHQ points per year faster than that amongst private sector employees, and this effect remains statistically well determined. In other words, the deterioration in public sector wellbeing seems to begin prior to the strong economic upturn of the late 1990s.

Whilst movements in the aggregate economy may play some role in the observed reduction in public sector wellbeing, the evidence here is that the paper's principal finding is probably not due to the business cycle.

²¹ The national (claimant) unemployment rate was 7.7 in 1991, 9.3 in 1992, 9.9 in 1993, 9.0 in 1994, 7.7 in 1995, 7.1 in 1996, 5.4 in 1997, 4.6 in 1998 and 4.0 in 1999 (Labour Market Trends, 2000).

The trend in public sector wellbeing by worker characteristics

Reforms to the public sector in the 1990s are unlikely to have affected employees uniformly. Tables 4a and 4b look at this issue more deeply. They examine the trends in GHQ mental stress for different groups of public-sector workers.

Column one of Table 4a displays the coefficient estimates for the pooled sample, in which an interaction effect now captures the trend in public sector GHQ. Disney, Gosling and Machin (1995) report evidence that in 1990 approximately 91 percent of public sector establishments recognised unions for manual workers and some 98 percent for non-manual employees. The respective figures in the private sector are 44 and 28 percent. The trend in public sector wellbeing may, in part, pick up changes in wellbeing within unionised plants, not captured by a union dummy.²² Column two thus restricts analysis to unionised workplaces, which is potentially an endogenous variable, and thus implicitly conditions upon union status. Results are essentially unchanged.

Columns three and four of Table 4a examine the trend in wellbeing for males and females respectively. Parameter estimates suggest mental stress among private sector females worsened, with a positive and statistically significant effect. For males the effect is smaller but the difference is not well-determined. It is not possible to reject the equality of the time-trend coefficients between men and women (these are 0.062 and 0.078 in columns three and four of Table 4a).

Columns five and six of Table 4a consider regional differences. The first estimates the time trend in wellbeing for the South of England (London, the South East and East Anglia), while the second column is for the North of England (North West and North East), Scotland and Wales. Within the South, public sector stress is estimated to increase, on average, by 0.043 GHQ points per year. This is below that observed for the country as a whole, and is not statistically robust. Within the North of England, Scotland

²² There may also be a problem of collinearity between public sector and union status.

and Wales (labelled NORTH, notwithstanding the inclusion of Wales), the public sector time trend is estimated to be 0.081 GHQ points per year, and in this case is statistically well determined at the ten percent level. The fall in wellbeing in the public sector is thus, if anything, larger outside the South-East of England, in regions where the growth in the economy has been less pronounced.

Table 4b studies the time trend in mental stress according to workers' highest academic qualification. Column one of Table 4b reports parameter estimates for individuals with no formal qualification, column two the individuals with at least one O-level, column three the workers with one A-level or more, and column four the degree-qualified employees. In the four cases, the growth in mental stress in the private sector is positive and similar, though the standard errors are not well-determined. For all education groups, the (relative) public sector time trend is observed to be positive; but only for those individuals with no formal qualification is it statistically robust. Here -- see column one of Table 4b -- mental stress grew, on average, by 0.170 GHQ points per year faster than that observed in the private sector. For the most highly qualified individuals, those with university degrees, the public sector time trend is smallest. Column four of Table 4b suggests that the estimated effect on graduates is 0.035 GHQ points per year (with a poorly defined standard error).²³

The evidence implies that the fall in wellbeing (rise in mental stress) within the public sector has been greatest for the less educated. This is consistent with the idea that the greatest impact of the public sector reforms, such as compulsory competitive tendering and privatisation of services, has been upon relatively less-skilled employees. Interestingly, Disney and Gosling (1998) find the public-sector pay premium to have

²³ Results are similar when we examine the effects separately for males and females.

almost entirely eroded for workers with no formal qualifications (between the 1980s and 1990s).²⁴

This decline in the relative pay of public workers may help explain the reduction in public sector wellbeing in the 1990s. Yet it would not seem to offer a complete explanation, because pay is controlled for in our regression equations.

The changing composition of public sector employment

The decline in wellbeing might be linked to the changing working conditions of some in the public sector. Estimates could, however, be biased due to the changing characteristics of public sector jobs. Reforms that have increased market pressure on low-skilled occupations may have caused a shift towards white-collar employment, as former public sector occupations have been reclassified as being within the private sector. This may explain the trend in GHQ stress -- if occupations that transferred from the public to the private sector were associated with low levels of stress. The largest increases in mental stress in the public sector are, however, observed for the least educated individuals, who are more likely to work within jobs switched to the private sector. Alternatively, for occupations remaining within the public sector, changing recruitment patterns may produce composition change *within* jobs.

Table 5 investigates these selection issues. It does so by estimating the time trend in public and private sector wellbeing for those individuals who remained in the same sector (the 'stayers') over the sample's nine-year period. The composition of public and private sector employees, within this sample, thereby remains unchanged. Columns one and four of Table 5 report results for those individuals observed in work in every wave (the balanced sample); columns two and five are for those workers observed in the same sector in each period (the 'stayers'). Compared to the results in Table 2b, the gradients of

²⁴ Elliot and Duffus (1996) observe a general decline in the public-sector wage premium, for all

both the public and private sector time trends are estimated to be greater in the balanced sample. This is especially true for the public sector sample.

Table 6 examines pure longitudinal changes in GHQ wellbeing. In this case, the same workers are followed over time. This is important, because it controls for any person fixed-effects.²⁵ Column one of Table 6 examines the one-year change in GHQ scores, for the years 1992 to 1999 (one period is lost from the data because of the first differencing). The public-sector parameter here measures, in the first column of Table 6, how much faster public sector GHQ has risen, on average, year-to-year relative to the private sector. The estimated one-year coefficient, at 0.096, is equivalent in size to the public sector time trend observed in column three of Table 2b, though in this case is not significantly different from zero at normal confidence levels.

Column two of Table 6 studies the change in wellbeing over the entire period, and examines how the same person's GHQ score alters between 1991 and 1999. The public sector dummy here captures the average growth in public sector stress over the period between 1991 and 1999, when compared to workers in the private sector. Reassuringly, the longitudinally-estimated public sector coefficient is equivalent in size to the paper's earlier estimates of the increase in public sector stress over the period, and is statistically significantly different from zero. Columns three and four of Table 6 similarly analyse the change in mental wellbeing for the sample of pure stayers, that is, those employees who remain consistently in either the private or public sector. The second and fourth columns of Table 6 looks at the 'long deltas', namely, the wellbeing change of individuals over nearly a decade. In a way inconsistent with the hypothesis that special

workers, once account is taken of occupational structure dating from the early 1970s.

²⁵ One might try to identify the difference in wellbeing trends between the public and private sectors by examining the change in wellbeing for job switchers between the sectors. This is not here attempted because of the relatively small number of individuals who in a year move between the sectors. Moreover, observed mobility is likely to capture a large degree of endogenous job choices and classification error. Rather, we focus upon the relative trend in GHQ over time.

selection effects might explain the paper's main finding²⁶, Table 6 reveals that even among those who start and remain in the public sector there is a worsening of psychological health of, as a point estimate, more than 0.8 GHQ points. As with earlier regressions, this result holds after controlling for workers' remuneration.

A final issue with these sorts of estimates is that of endogenous job choice. Within a sector where the conditions of work are worsening, it is likely to be those who dislike a new regime who are prone to leave most readily. Observing those who remain within the public sector then may underestimate the true decline in wellbeing, and the estimates above are likely to give a lower bound on the true deterioration of working life in public sector stress. This logic could, however, be mitigated by investment in sector-specific skills, which may make it unprofitable to switch jobs even as conditions deteriorate.

In broad summary, the estimates suggest that between 1991 and 1999 the mental stress levels of British public sector employees worsened, relative to the private sector, by approximately 0.5 GHQ points. There is evidence that this trend cannot be explained by changes in the composition of public sector employment or by pay levels alone.

An alternative measure of mental distress

An alternative way to measure GHQ mental distress is to form a dichotomous indicator of those likely to be at risk of psychiatric morbidity. This is commonly measured as a count of those individuals who respond negatively to four or more of the twelve GHQ questions.²⁷

In this spirit, Table 7 presents the sample proportions of individuals with high mental distress, within the public and private sectors, over time. The broad patterns in

²⁶ Some of our conference discussants, for instance, raised the hypothetical possibility that, during the 1990s, increasingly stress-prone people switched into public sector work.

²⁷ See Bowling (1997) for a full discussion.

proportions are similar to those observed for the (Likert) overall GHQ score in Table 1. For public sector employees, there has been a statistically significant increase over the decade in the proportion of employees with high measured mental distress. For private sector employees, in contrast, the growth in the proportion of those at risk is small and not statistically robust. Once again, by the end of the period the incidence of mental distress is statistically significantly greater in the state sector.

Table 8a examines whether public sector workers are more likely to report high mental distress scores. It reports the data for each year of the 1990s. Estimation is by the Probit technique and positive coefficients are associated with an increased likelihood of mental distress.²⁸ For the early 1990s, the incidence of high mental distress – whilst generally more likely -- in the public sector is not statistically significantly different from that in the private sector. However, for 1997 and 1998 we do observe a positive and statistically robust public sector coefficient, although in 1999 the coefficient is not well determined. By the end of the 1990s, public sector employees are more likely to be characterised as being highly distressed.²⁹

These numbers may conceal changes in the composition of public sector jobs. Table 8b thus examines the model for the sample of ‘stayers’. A similar pattern in the estimated public sector coefficients, to that in Table 8a, is observed and if anything shows a more pronounced trend over time. The public sector effect is only well determined towards the end of the period.

Whilst a greater time span would be desirable to decide the permanence of these results, they reinforce earlier sections’ conclusions.

Job satisfaction

²⁸ Examining marginal effects suggests a similar qualitative interpretation.

²⁹ Analogous to previously, when these data are pooled over time, we observe a positive and well-determined trend in public sector stress over and above that observed in the private sector.

An alternative measure of worker wellbeing is now considered. Versions of equation (2) are estimated where job satisfaction is the dependent variable. The job satisfaction data are observed as ordered categorical responses (on a 1 to 7 scale). Estimation is by the Ordered Probit technique of McKelvey and Zavoina (1975). Positive coefficients here denote higher levels of wellbeing.

Mean satisfaction scores are reported, for the public and private sectors, in Table 9. Figure 2 plots the time trends. Consistent satisfaction data here cover only the period 1991 to 1997, and results are henceforth restricted to that period. Comparable to the rise in GHQ mental stress, we see a sharp drop in mean job satisfaction levels in the early 1990s, but one which flattens out in 1994 and reverses slowly thereafter. Whereas public sector satisfaction was, on average, 0.18 points higher than that observed in the private sector in 1991, by 1997 the gap had all but disappeared. It had become only 0.03. This fall in job satisfaction is of a similar magnitude to the difference in satisfaction levels observed, in the sample, between union and non-union workplaces (see Freeman, 1978, for a discussion of union voice and job satisfaction).

An additional issue with these satisfaction data is that in 1991 the categories 1, 4 and 7 were given descriptions whilst 2, 3, 5 and 6 were left unlabeled. This had the effect of providing focal points for responses at those categories with titles. As the job satisfaction data are positively skewed, with mean values of above 5 on a 1 to 7 scale, this may over-estimate job satisfaction in 1991. From 1992 onwards, all categories were given a descriptive label. The question itself was a constant.

Whilst satisfaction in 1991 may be overstated, it is not clear why public sector workers should respond to this discrepancy in a systematically different way from employees in the private sector. The question format in 1991 would then add noise, but not bias, into comparisons of public and private sector employees. Yet the way the question in 1991 provided focal points to responses may lead to measurement error that

is positively related to true satisfaction. That would lead to an overstatement of any satisfaction differential in that year. Table 10a attempts to analyse this -- by examining cross-section snapshots of workers for each year between 1991 and 1997. It estimates the satisfaction differential between public and private sectors workers. In 1991 the public sector parameter is estimated to be 0.129. This effect remains relatively stable at approximately 0.1 for the years 1992 to 1995, but in 1996 and 1997 the estimated coefficient is attenuated and no longer statistically significantly different from zero. Table 10b presents the marginal effects associated with the estimates. In 1991, public sector employees are observed to be 5 percent more likely to be 'mostly' or 'completely' satisfied (categories 6 and 7). For the period 1992 to 1995, the figure lies between 3.4 and 4.0 percent. In 1996 this falls to 2.0 percent, and in 1997 to 1.2 percent.

During the early 1990s, when job satisfaction was falling, the public-sector satisfaction differential remained positive and statistically significantly different from zero. This suggests that any dissatisfaction resulting from public sector reforms was, at least partially, offset by growing dissatisfaction amongst private sector employees. Only in the late 1990s -- when private sector satisfaction rose faster than that in the public sector -- did the estimated differential fall.

Whilst the difference in the estimated public sector effect between 1991 and 1992 is relatively minor, we henceforth err on the side of caution and restrict attention to the sample period 1992 to 1997.³⁰ Table 11 pools the data over time and estimates the coefficient on time trends in job satisfaction. We again observe a statistically significant worsening of worker wellbeing, here job satisfaction, for workers within the state sector between 1992 and 1997. Amongst private sector employees, there is a small and statistically insignificant fall in job satisfaction. Column three, where we pool the public and private sectors and use an interaction term, confirms these findings.

³⁰ Results are, however, qualitatively the same for the period 1991 to 1997.

Whilst these estimates are likely to mask the dip in observed job satisfaction in the middle of the decade (Figure 2), they suggest that the satisfaction differential between public and private sector occupations narrowed between 1991 and 1997. Finally, the estimated time trend in public-sector job satisfaction is essentially the same if we omit the controls for pay and the hours of work.

5. Conclusions

Working life in Great Britain grew worse during the 1990s. The deterioration was particularly sharp in the public sector. Job satisfaction there fell, and stress levels increased. Among private sector employees, mental strain rose between 1991 and 1999. Job satisfaction in that sector ran approximately flat through the period.³¹

The decline in the wellbeing of public sector workers -- using a standard GHQ stress measure -- is large. Our estimates, which use panel data on approximately 5000 British workers interviewed every year, suggest that it is between one half point and one full point on a 36-point GHQ scale. In individual data, unemployment is known to produce approximately a 2-point worsening of GHQ. Considering the small number of years, the size of the fall in mental wellbeing among public sector workers seems remarkable. Other nations who are thinking of adopting the British government's policies towards the public sector might wish to be aware of these findings³².

More detailed conclusions are as follows. First, the evidence suggests that composition change within public sector employment and the relative decline in public sector pay are not sufficient explanations. Second, the decline in public sector wellbeing is not due to the stage of the business cycle. Third, the results are not caused by special selection effects in which, for example, the public sector hired highly stressed individuals

³¹ We control for wages, so it is not simply that workers swapped higher effort for more pay.

³² It is theoretically possible that productivity improvements were so large that the losses from workers' lower mental wellbeing were outweighed by social gains. We cannot test that hypothesis with our data.

during the 1990s: the lives of the ‘stayers’ also worsened through the decade³³. Fourth, the decline in the measured quality of working life in the public sector is found fairly uniformly across men and women, the union and non-union sectors, and the north and south of the country. There is some indication, however, that the wellbeing fall is greatest among public sector employees with particularly low levels of education.

Despite its prosperity, the 1990s was a bad decade for Britain’s workers.

³³ There are not enough observations to allow us to take the alternative approach of estimating the public*time dummies using data on switchers alone.

GHQ MENTAL STRESS SCORES

TABLE 1
Mean Scores in GHQ Mental Stress over Time

<i>Public and Private Sector Employees over Time</i>		
Year	PUBLIC	PRIVATE
1991	10.36 (4.55)	10.14 (4.31)
1992	10.94 (4.81)	10.58 (4.68)
1993	10.85 (4.78)	10.54 (4.87)
1994	11.13 (4.96)	10.69 (5.04)
1995	11.41 (5.48)	10.71 (4.89)
1996	11.29 (5.37)	10.71 (4.99)
1997	11.50 (5.60)	10.59 (4.96)
1998	11.63 (5.62)	10.65 (4.98)
1999	11.32 (5.51)	10.49 (4.90)
<i>Total</i>	<i>11.14 (5.19)</i>	<i>10.56 (4.85)</i>

- Standard deviations are in parenthesis.
- The GHQ variable measures mental distress or **lack** of psychological wellbeing on a 36-point scale, with 0 being the lowest level of distress and 36 the highest.

FIGURE 1
GHQ Levels of UK Workers over the 1990s
Public and Private Sector Employees

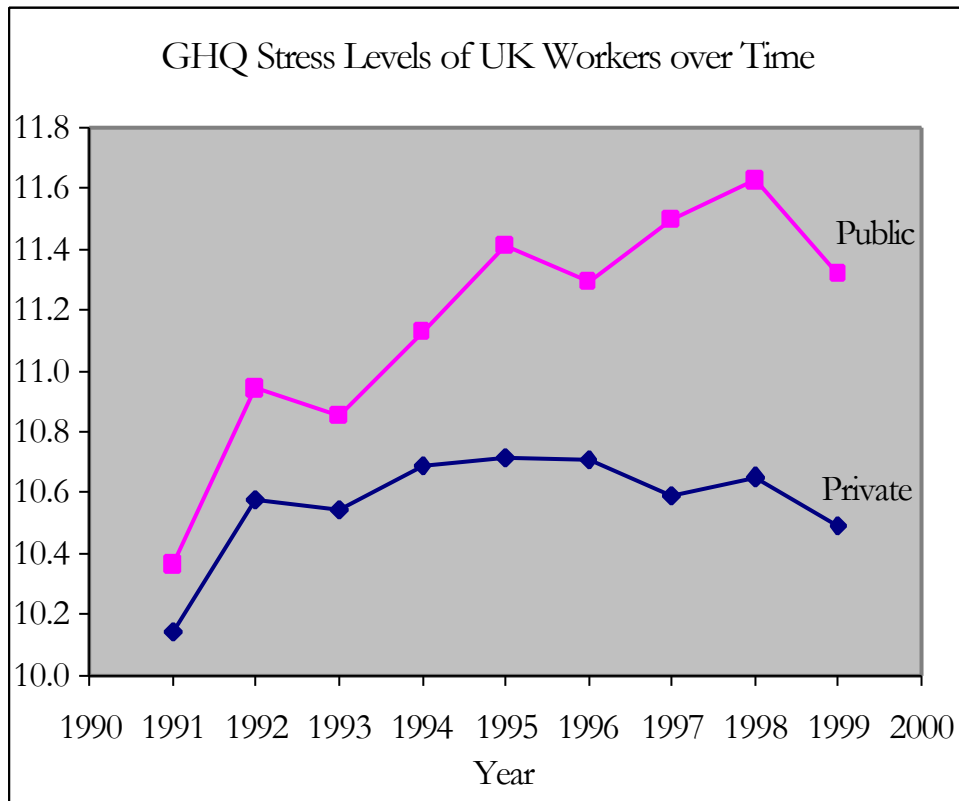


TABLE 2a
The Trend in GHQ Mental Stress Scores over Time (1991-9)
Coefficients upon Year Dummies
Dependent Variable: GHQ

<i>Regressor</i>	<i>PUBLIC</i>	<i>PRIVATE</i>	<i>ALL</i>
1992	0.577 (0.151)	0.408 (0.098)	0.405 (0.098)
1993	0.468 (0.165)	0.349 (0.107)	0.344 (0.107)
1994	0.688 (0.171)	0.475 (0.111)	0.469 (0.111)
1995	0.933 (0.188)	0.510 (0.113)	0.497 (0.113)
1996	0.782 (0.189)	0.509 (0.113)	0.491 (0.112)
1997	0.926 (0.199)	0.408 (0.112)	0.387 (0.112)
1998	1.016 (0.198)	0.462 (0.113)	0.442 (0.113)
1999	0.728 (0.203)	0.312 (0.117)	0.290 (0.117)
Public Sector			-0.259 (0.161)
Public*1992			0.188 (0.179)
Public*1993			0.156 (0.197)
Public*1994			0.270 (0.204)
Public*1995			0.503 (0.220)
Public*1996			0.357 (0.219)
Public*1997			0.625 (0.226)
Public*1998			0.678 (0.225)
Public*1999			0.532 (0.229)
Ln(pay)	-0.175 (0.200)	-0.316 (0.104)	-0.330 (0.090)
Normal Hours/10	0.090 (0.120)	0.046 (0.059)	0.088 (0.051)
Age	0.296 (0.056)	0.237 (0.029)	0.245 (0.026)
Age ² /100	-0.335 (0.070)	-0.281 (0.036)	-0.285 (0.032)
Job tenure	0.130 (0.031)	0.050 (0.017)	0.073 (0.015)
(Job tenure) ² /100	-0.286 (0.114)	-0.149 (0.062)	-0.191 (0.057)

Workplace Size: 25 plus	-0.111 (0.177)	-0.104 (0.094)	-0.133 (0.083)
Male	-1.156 (0.201)	-1.087 (0.128)	-1.113 (0.107)
Ethnic minority	0.200 (0.461)	0.281 (0.297)	0.254 (0.250)
Years of schooling	0.077 (0.032)	0.065 (0.025)	0.068 (0.019)
Single	0.518 (0.184)	0.286 (0.115)	0.383 (0.097)
Temporary Job	0.293 (0.247)	0.370 (0.170)	0.259 (0.138)
Union recognition	-0.026 (0.252)	0.109 (0.100)	0.121 (0.092)
<i>Highest Educational Qualification</i>			
O-Level	0.092 (0.290)	-0.259 (0.141)	-0.183 (0.128)
A-Level	0.051 (0.357)	-0.142 (0.174)	-0.119 (0.156)
HND	0.099 (0.417)	-0.273 (0.261)	-0.179 (0.216)
Degree	-0.016 (0.418)	-0.261 (0.260)	-0.158 (0.218)
Post-graduate Degree	0.519 (0.490)	-0.535 (0.438)	0.040 (0.323)
<i>Observations</i>			
Individuals (N _i)	2411	6151	8034
Panel Total (NT)	10257	25304	36984
Adjusted R ²	0.04	0.03	0.03

1. All equations are estimated by OLS. Standard errors are in parentheses and are robust to arbitrary heteroscedasticity and the repeat sampling of the same individuals over time.
2. 'Pay' and 'Normal Hours' are weekly. Pay is real: it is deflated by the GDP deflator for each year. Education dummies are relative to no qualification. All columns also include controls for occupation (SOC code at the one-digit level) and region. Parameter estimates are not reported.
3. The year dummies show how GHQ has increased relative to 1991. GHQ is measured on a 0-36 scale, so a year dummy coefficient of, say, 0.5 implies a one-half point higher level of stress in that year compared to the omitted base year.
4. Column three also includes controls for non-government non-profit organisations. For this column year dummies capture the time trend in the private sector. The public-year interactions capture the difference in trend between the public and private sectors, the public indicator the difference in constant terms.

TABLE 2b
 GHQ Mental Stress Scores over Time (1991-9) and Unemployment
Coefficients upon a Time Trend
 Dependent Variable: GHQ

<i>Regressor</i>	<i>PUBLIC</i>	<i>PRIVATE</i>	<i>ALL</i>	<i>ALL</i>
Time trend	0.091 (0.023)	0.028 (0.013)	0.025 (0.013)	0.050 (0.021)
Public Sector			-0.281 (0.156)	-0.466 (0.449)
Public*(Time trend)			0.079 (0.025)	0.102 (0.039)
Ln(pay)	-0.164 (0.199)	-0.321 (0.104)	-0.333 (0.090)	-0.349 (0.092)
County Unemployment Rate				0.010 (0.024)
Public*(Unemployment Rate)				0.013 (0.040)
<i>Observations</i>				
Individuals (N _i)	2411	6151	8034	7737
Panel Total (NT)	10257	25304	36984	33000
Adjusted R ²	0.04	0.03	0.03	0.03

1. The regression controls are as in Table 2a.
2. The time trend here equals 1 if the year is 1991, 2 if the year is 1992, ..., and 9 if the year is 1999.
3. In column three the time trend captures the trend in the private sector. The public-trend interaction captures the difference in time trend between the public and private sectors, the public sector indicator the difference in constant terms.

TABLE 3
 GHQ Mental Stress Equations
Coefficients upon a Time Trend: Different Sample Periods
 Dependent Variable: GHQ

<i>Regressor</i>	<i>PUBLIC</i> <i>1992-9</i>	<i>PRIVATE</i> <i>1992-9</i>	<i>ALL</i> <i>1992-9</i>	<i>ALL</i> <i>1991-5</i>
Time trend	0.053 (0.027)	-0.004 (0.015)	-0.007 (0.015)	0.036 (0.037)
Public Sector			-0.262 (0.192)	-0.313 (0.273)
Public*(Time trend)			0.071 (0.030)	0.102 (0.071)
Ln(pay)	-0.203 (0.216)	-0.312 (0.110)	-0.343 (0.096)	-0.283 (0.117)
<i>Observations</i>				
Individuals (N _i)	2225	5626	7374	5867
Panel Total (NT)	8966	22211	32413	16043
Adjusted R ²	0.04	0.03	0.03	0.03

1. The regression controls are as in Table 2a.

TABLE 4a
 GHQ Mental Stress Equations (1991-9)
All employees: By Union recognition, Gender and Region
 Dependent Variable: GHQ

<i>Regressor</i>	<i>ALL</i>	<i>UNION</i>	<i>MALE</i>	<i>FEMALE</i>	<i>SOUTH</i>	<i>NORTH</i>
Time trend	0.025 (0.013)	0.026 (0.021)	0.010 (0.016)	0.046 (0.021)	0.036 (0.022)	0.034 (0.024)
Public Sector	-0.281 (0.156)	-0.292 (0.189)	-0.314 (0.228)	-0.105 (0.224)	-0.107 (0.279)	-0.216 (0.274)
Public*(Time trend)	0.079 (0.025)	0.086 (0.031)	0.062 (0.039)	0.078 (0.035)	0.043 (0.045)	0.081 (0.044)
Ln(pay)	-0.333 (0.090)	-0.413 (0.135)	-0.511 (0.133)	-0.202 (0.138)	-0.242 (0.157)	-0.476 (0.157)
<i>Observations</i>						
Individuals (N _i)	8034	4563	3977	4057	2801	2530
Panel Total (NT)	36984	18929	18252	18732	12423	11484
Adjusted R ²	0.03	0.04	0.02	0.02	0.02	0.05

1. See notes to Table 2b.
2. UNION denotes a union recognised workplace.
3. SOUTH includes London, the South East of England and East Anglia.
4. NORTH includes the North East of England, the North West of England, Scotland and Wales.

TABLE 4b
 GHQ Mental Stress Equations by Educational Group (1991-9)
All employees: By Education
 Dependent Variable: GHQ

<i>Regressor</i>	<i>NONE</i>	<i>O-LEVEL</i>	<i>A-LEVEL</i>	<i>DEGREE</i>
Time trend	0.034 (0.027)	0.031 (0.020)	0.015 (0.025)	0.030 (0.043)
Public Sector	-0.666 (0.334)	-0.179 (0.266)	-0.412 (0.289)	-0.015 (0.458)
Public*(Time trend)	0.170 (0.064)	0.061 (0.043)	0.081 (0.046)	0.035 (0.066)
Ln(pay)	-0.227 (0.203)	-0.196 (0.145)	-0.386 (0.176)	-0.709 (0.243)
<i>Observations</i>				
Individuals (N _i)	1964	3045	2271	1173
Panel Total (NT)	8236	13550	10072	5126
Adjusted R ²	0.04	0.04	0.04	0.05

1. See notes to Table 2b. Education refers to highest (formal) qualification, or equivalent.

TABLE 5
 Testing the Main Result for a Sub-sample of Stayers (1991-9)
The Effect of Composition Change: By Sector
 Dependent Variable: GHQ

<i>Regressor</i>	<i>PUBLIC</i>		<i>PRIVATE</i>	
	<i>BALANCE</i>	<i>STAYERS</i>	<i>BALANCE</i>	<i>STAYERS</i>
Time trend	0.174 (0.038)	0.158 (0.042)	0.038 (0.023)	0.045 (0.024)
Ln(pay)	-0.297 (0.387)	-0.191 (0.458)	-0.191 (0.220)	-0.314 (0.238)
<i>Observations</i>				
Individuals (N_i)	562	384	959	777
Panel Total (NT)	4282	3456	7779	6993
Adjusted R^2	0.05	0.05	0.03	0.03

1. See notes to Table 2b.
2. BALANCE denotes a respondent observed within the sample for all waves (1991-1999). STAYER denotes an employee observed in the same sector in all eight waves.
3. PUBLIC JOB denotes an occupation considered that has remained largely untouched by privatisation and competitive tendering, and where composition change is limited (see Appendix).

TABLE 6
 A Longitudinal Test (1991-9)
The Change in Wellbeing
 Dependent Variable: ΔGHQ or $\Delta 8GHQ$

<i>Regressor</i>	ΔGHQ	$\Delta 8GHQ$	ΔGHQ	$\Delta 8GHQ$
	<i>ALL</i>	<i>ALL</i>	<i>STAYERS</i>	<i>STAYERS</i>
	<i>1992-9</i>	<i>1999</i>	<i>1992-9</i>	<i>1999</i>
Public	0.096 (0.061)	0.970 (0.335)	0.121 (0.068)	0.825 (0.461)
Ln(pay)	-0.098 (0.061)	0.543 (0.285)	-0.013 (0.081)	-0.121 (0.425)
<i>Observations</i>				
Individuals (N_i)	5943	2216	1177	1177
Panel Total (NT)	26766	2216	9416	1177
Adjusted R^2	0.00	0.03	0.00	0.03

1. See notes to Table 2b.
2. ALL denotes the unbalanced sample for of respondents for whom a change in GHQ is observed. STAYER denotes an employee observed in the same sector in all eight waves.
3. All equations are estimated by OLS. Standard errors are in parentheses and are robust to arbitrary heteroscedasticity and the repeat sampling of the same individuals over time.
4. ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). $\Delta 8GHQ$ is the change in GHQ score over the full period of the panel ($GHQ_t - GHQ_{t-8}$) = ($GHQ_{1999} - GHQ_{1991}$).
5. 1992-9 then denotes that *changes* in GHQ are only available for that period.

TABLE 7
Proportion of Respondents with High Mental Stress
Public and Private Sector Employees over Time

Year	PUBLIC	PRIVATE
1991	0.17 (0.37)	0.15 (0.35)
1992	0.20 (0.40)	0.19 (0.39)
1993	0.20 (0.40)	0.18 (0.38)
1994	0.21 (0.40)	0.18 (0.38)
1995	0.21 (0.41)	0.17 (0.37)
1996	0.21 (0.40)	0.18 (0.38)
1997	0.23 (0.42)	0.17 (0.38)
1998	0.25 (0.43)	0.17 (0.37)
1999	0.21 (0.41)	0.16 (0.37)
<i>Total</i>	0.21 (0.41)	0.17 (0.38)

- Standard deviations are in parenthesis.
- The measure of high mental distress is a dichotomous indicator, taking the value 1 if an individual answers negatively to four or more of the twelve GHQ questions and 0 otherwise.
- This measure is commonly employed as an indicator of likely psychiatric disorder.

TABLE 8a
Yearly Cross-section High Mental Stress Regressions (1991-9)
The Public Sector Effect
Dependent Variable: High Mental Stress

<i>Regressor</i>	1991	1992	1993	1994	1995	1996	1997	1998	1999
Public Sector	0.097 (0.065)	0.023 (0.065)	0.059 (0.068)	0.036 (0.067)	0.014 (0.068)	-0.022 (0.067)	0.158 (0.067)	0.136 (0.068)	0.090 (0.069)
Ln(pay)	0.031 (0.058)	-0.056 (0.058)	-0.089 (0.061)	-0.030 (0.058)	-0.076 (0.055)	-0.055 (0.057)	-0.071 (0.054)	-0.095 (0.058)	0.010 (0.060)
<i>Observations</i>									
Individuals	4571	4141	3915	3968	4019	4125	4144	4117	3984
Log-L	-1923.1	-1976.8	-1831.0	-1865.9	-1876.3	-1947.1	-1946.0	-1927.2	-1798.0
Pseudo R ²	0.035	0.040	0.044	0.042	0.046	0.053	0.051	0.071	0.047

1. All equations are estimated by the Probit technique. Standard errors are in parentheses and are robust to arbitrary heteroscedasticity.
2. All columns include the same controls as in Table 2a. Parameter estimates are not reported.
3. The public sector dummy is relative to those in the private sector, in the sample year.
4. The Pseudo R² is calculated using the method of McKelvey and Zavoina (1975).

TABLE 8b
Yearly Cross-section High Mental Stress Regressions (1991-9)
The Public Sector Effect: The 'Stayers'
Dependent Variable: High Mental Stress

<i>Regressor</i>	1991	1992	1993	1994	1995	1996	1997	1998	1999
Public Sector	0.063 (0.136)	0.054 (0.122)	-0.027 (0.125)	-0.129 (0.123)	0.158 (0.127)	0.007 (0.125)	0.154 (0.129)	0.281 (0.129)	0.220 (0.128)
Ln(pay)	-0.126 (0.139)	-0.028 (0.122)	0.025 (0.127)	-0.180 (0.125)	-0.117 (0.121)	-0.200 (0.118)	0.071 (0.125)	-0.214 (0.127)	0.072 (0.128)
<i>Observations</i>									
Individuals	1177	1177	1177	1177	1177	1177	1177	1177	1177
Log-L	-427.0	-517.5	-511.1	-496.1	-492.2	-530.4	-527.9	-543.9	-495.5
Pseudo R ²	0.099	0.082	0.084	0.102	0.117	0.068	0.092	0.134	0.105

1. See notes to Table 8b. STAYER denotes a respondent observed in the same sector in every period.

JOB SATISFACTION

TABLE 9
Mean Job Satisfaction Scores over Time

<i>Public and Private Sector Employees over Time</i>		
Year	<i>PUBLIC</i>	<i>PRIVATE</i>
1991	5.58 (1.41)	5.40 (1.57)
1992	5.56 (1.30)	5.42 (1.41)
1993	5.45 (1.33)	5.35 (1.40)
1994	5.36 (1.39)	5.29 (1.43)
1995	5.39 (1.29)	5.30 (1.39)
1996	5.40 (1.28)	5.36 (1.34)
1997	5.43 (1.27)	5.40 (1.32)
<i>Total</i>	<i>5.46 (1.33)</i>	<i>5.36 (1.41)</i>

- Standard deviations are in parenthesis.
- The job satisfaction variable measures overall satisfaction on a 7-point scale, with 1 being the lowest level of satisfaction and 7 the highest. In 1991 the categories 1, 4 and 7 were given descriptions whilst 2,3,5 and 6 are left unlabeled. From 1992 onwards all values were given a label. The question itself was a constant. In 1998 the process by which the question is asked was changed.

FIGURE 2
Job Satisfaction Levels of UK Workers over Time
Public and Private Sector Employees

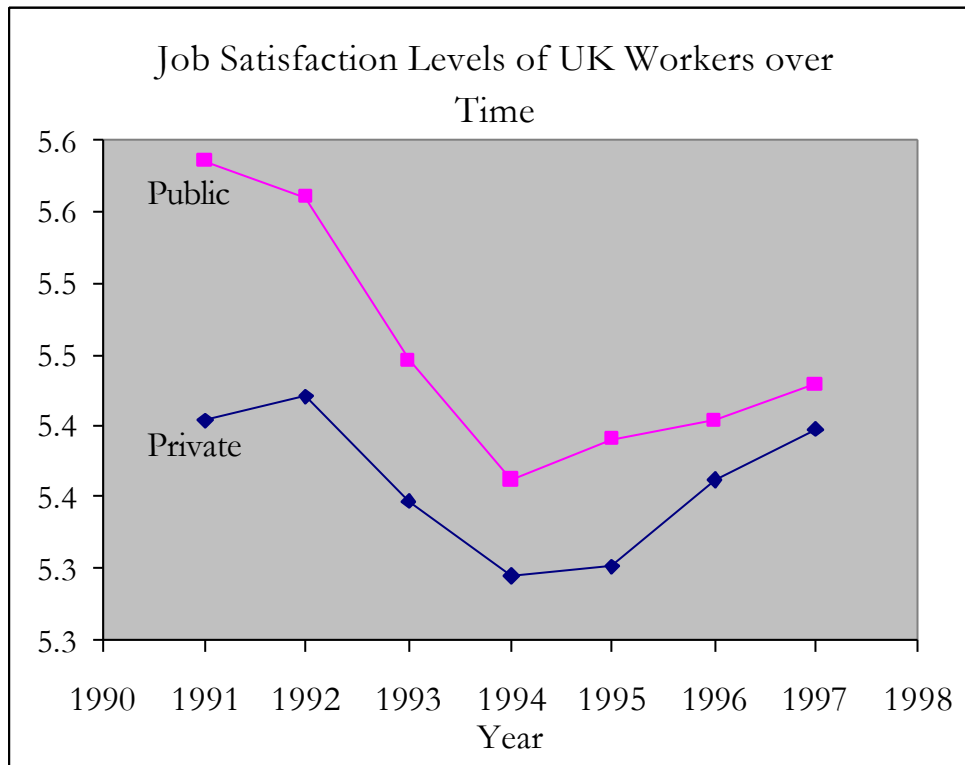


TABLE 10a
Yearly Cross-section Job Satisfaction Equations (1991-7)
The Public Sector Effect

Dependent Variable: Overall Job Satisfaction							
<i>Regressor</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>
Public Sector	0.129 (0.045)	0.099 (0.047)	0.100 (0.048)	0.102 (0.048)	0.115 (0.049)	0.052 (0.049)	0.031 (0.048)
Ln(pay)	0.028 (0.040)	0.078 (0.044)	0.058 (0.045)	0.036 (0.043)	-0.020 (0.042)	-0.006 (0.042)	0.025 (0.041)
<i>Observations</i>							
Individuals (N _i)	4551	4127	3897	3949	4009	4115	4132
Log-Likelihood	-7216.3	-6137.8	-5836.9	-6059.4	-6013.2	-6076.9	-6054.2
Pseudo R ²	0.089	0.097	0.095	0.091	0.102	0.087	0.087

1. Consistent job satisfaction data are available only up to 1997.
2. All equations are estimated by the Ordered Probit technique. Robust standard errors are in parentheses.
3. All columns include the same set of controls as in Table 2a. Coefficients are not reported.
4. The public sector dummy is relative to those in the private sector, in the sample year.
5. Consistent Job satisfaction data cover only the period 1991-1997.
6. The Pseudo R² is calculated using the method of McKelvey and Zavoina (1975).

TABLE 10b
The Marginal Effect of the Time Trend upon Overall Job Satisfaction

<i>Sample</i>	Overall Satisfaction Score						
	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>
1991	-0.008	-0.004	-0.008	-0.017	-0.013	0.005	0.045
1992	-0.004	-0.005	-0.009	-0.008	-0.012	0.010	0.027
1993	-0.004	-0.004	-0.010	-0.008	-0.012	0.014	0.024
1994	-0.004	-0.006	-0.010	-0.008	-0.011	0.016	0.024
1995	-0.004	-0.006	-0.011	-0.010	-0.014	0.019	0.025
1996	-0.002	-0.002	-0.005	-0.004	-0.006	0.009	0.011
1997	-0.001	-0.001	-0.003	-0.002	-0.004	0.005	0.007

1. Row one corresponds to column one of Table 10a above. Row two to column two, etc.
2. The marginal effects are calculated as the difference in the predicted probability, of satisfaction score k, when moving from the private to public sector.

TABLE 11
The Trend in Job Satisfaction Scores over Time (1992-7)
Coefficients upon a Time Trend
Dependent Variable: Overall Job Satisfaction

<i>Regressor</i>	<i>PUBLIC</i>	<i>PRIVATE</i>	<i>ALL</i>
Time trend	-0.026 (0.008)	-0.007 (0.005)	-0.006 (0.005)
Public Sector			0.169 (0.050)
Public*(Time trend)			-0.019 (0.009)
Ln(pay)	-0.023 (0.053)	0.041 (0.028)	0.027 (0.024)
<i>Observations</i>			
Individuals (N _i)	2015	5019	6712
Panel Total (NT)	6861	16477	24229
Log-likelihood	-9933.5	-25126.4	-36297.4
Pseudo R ²	0.102	0.082	0.087

1. See notes to Table 10. Standard errors are robust to the repeat sampling of individuals over time.
2. In column three, the time trend captures the trend in the private sector. The public-trend interaction captures the difference in time trend between the public and private sectors. The public sector dummy shows the level of job satisfaction for the base person in the public sector.

References

- Blackaby, D. H., Murphy, P. D., and N. C. O'Leary. "The payment of public sector workers in the UK: Reconciliation with North American findings." *Economic Letters* 65 (1999): 239-243.
- Blanchflower, D. G., and A. J. Oswald. "Well-being over time in Britain and the USA", working paper, NBER working paper, 2000.
- Bowling, A. *Measuring Health: A Review of Quality of Life Scales*. 2nd ed. Buckingham, UK: Open University Press, 1997.
- Clark, A. E., and A. J. Oswald. "Unhappiness and unemployment." *Economic Journal* 104 (1994): 648-659.
- Disney, R., and A. Gosling. "Does it pay to work in the public sector?" *Fiscal Studies* 19 (1998): 347-374.
- Disney, R., Gosling, A., and S. Machin. "What has happened to union recognition in Britain?" *Economica* 63 (1996): 1-18.
- Easterlin, R. A. "Does economic growth improve the human lot? Some empirical evidence." In *Nations and Households in Economic Growth: Essays in Honour of Moses Abramowitz*, edited by P.A. Reder and M.W. David. New York and London: Academic Press, 1974.
- Easterlin, R.A. "Income and happiness: Towards a unified theory" *Economic Journal* 111 (2001): 465-484.
- Elliot, R. F., and K. Duffus. "What has been happening to pay in the public-service sector of the British economy? Developments over the period 1970-1992." *British Journal of Industrial Relations* 34 (1996): 51-85.
- Freeman, R. B. "Job satisfaction as an economic variable." *American Economic Review* 68 (1978): 125-141.
- Frey, B. S. and A. Stutzer. *Happiness and Economics*. Princeton, USA: Princeton University Press, forthcoming, 2001.
- Greene, W. *Econometric Analysis*. 4th ed. London: Prentice-Hall, 2000.
- Gregory, R. G., and J. Borland. "Recent developments in public sector labor markets." *Handbook of Labor Economics*. edited by O. Ashenfelter and D. Card, 3573-630. Vol. 3C. Amsterdam: Elsevier Science, 1999.
- Hamermesh, D. S. "Economic aspects of job satisfaction." In *Essays in Labor Market Analysis*, edited by O. Ashenfelter and W. Oates. New York: John Wiley and Sons, 1977.
- . "The changing distribution of job satisfaction." *Journal of Human Resources* 36 (2001): 1-30.

- Helliwell, J.F. "How is life? ", mimeo, Department of Economics, University of British Columbia and Oxford University, April, 2001.
- Kahneman, D., Wakker, P. P., and R. Sarin. "Back to Bentham? Explorations of experienced utility." *Quarterly Journal of Economics* 112 (1997): 375-406.
- Kapur, N., Borrill, S., and C. Stride. "Psychological morbidity and job satisfaction in hospital consultants and junior house officers: multi-centre, cross sectional survey." *British Medical Journal* 317 (1998): 511-512.
- Labour Market Trends*. London: Office for National Statistics, 2000.
- Layard, R. "Human satisfactions and public policy." *Economic Journal* 90 (1980): 737-750.
- Machin, S. "Editorial: Will the NHS pay awards help recruitment." *British Medical Journal* 318 (1999): 958.
- McKelvey, W., and R. Zavoina. "A statistical model for the analysis of ordinal-level dependent variables." *Journal of Mathematical Sociology* 4 (1975): 103-120.
- Nathan, G. "A review of sample attrition and representativeness in three longitudinal surveys", Office for National Statistics, London, 1999.
- Oswald, A. J. "Happiness and economic performance." *Economic Journal* 107 (1997): 1818-1831.
- Ravallion, M and Lokshin, M. "Identifying welfare effects from subjective questions." *Economica* 68 (2001): 335-357.
- Warr, P. B. "Well-being and the workplace." In *Well-being: The Foundations of Hedonic Psychology*, edited by D. Kahneman, E. Diener, and N. Schwarz, 392-412. New York: Russel Sage, 1999.
- West, M. A., Smith, H., Feng, W., and R. Lawthom. "Research excellence and departmental climate in British Universities", working paper, Institute of Work Psychology, University of Sheffield, 1998.